

Appln. No. 10/024,759

Amot. dated March 2, 2005

Reply to Office Action dated December 14, 2004

R E M A R K S / A R G U M E N T S

Reconsideration of the present application, as amended, is respectfully requested.

The December 14, 2004 Office Action and the Examiner's comments have been carefully considered. In response, the Abstract, written description and claims are amended, and remarks are set forth below in a sincere effort to place the present application in form for allowance. The amendments are supported by the application as originally filed. Therefore, no new matter is added,

SPECIFICATION

The specification has not been amended to include section headings as requested by the Examiner since section headings are not required by MPEP Section 608.01(a).

In the Office Action, the disclosure is objected to because of an informality on page 4, line 7 regarding the definition of voxel which discloses a value. In response, the disclosure is amended in a sincere effort to overcome the objection. Specifically, the disclosure is amended to clarify that voxels other than the boundary vessel voxels are set at a high distance data value such as 127. Thus, the voxels are not defined as values but

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are provided with initial distance data values depending on their type. In view of the amendment of the disclosure, reconsideration and withdrawal of the objection to the disclosure are respectfully requested.

#### ABSTRACT OF THE DISCLOSURE

The Abstract has been amended to remove the informalities noted by the Examiner. No new matter is added. A substitute Abstract on a separate sheet is submitted herewith.

In view of the amendment of the Abstract of the Disclosure, reconsideration and withdrawal of the objection to the Abstract of the Disclosure are respectfully requested.

#### CLAIM OBJECTIONS

In the Office Action, claim 1 is objected to because it includes reference characters. In response, claim 1 is amended to remove the reference characters in a sincere effort to overcome the objection. Claims 2, 3 and 9 are also amended to remove reference characters. In view of the amendment of claim 1, reconsideration and withdrawal of the objection to claim 1 are respectfully requested.

Claims 1-10 are amended to place the claims in better form for allowance. The amendments are not related to the patentability of the claims.

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#### PRIOR ART REJECTIONS

In the Office Action, claims 1-7 and 10 are rejected under 35 USC 102(e) as being anticipated by USP 6,309,353 (Cheng et al.). Claims 8 and 9 are rejected under 35 USC 103 as being unpatentable over Cheng et al. in view of USP 6,690,816 (Aylward et al.).

In response, claim 1 is amended in order to even more clearly set forth the order in which the steps in the method in accordance with the invention are performed. Thus, the method includes the steps of classifying the voxels as voxels of the first, the second or further types, thereafter determining which of the voxels of the first type are boundary voxels that adjoin voxels of the second or further types, which is followed by assigning a data value to each voxel of the first type, the data value representing a measure of the distance between that voxel and the nearest boundary voxel, and thereafter classifying the voxels of the first type that have a distance data value exceeding a predetermined threshold as aberration voxels indicative of an aberration in the object.

In the method described in the specification for determining the volume of an aneurysm (an aberration in an object, i.e., a blood vessel), the "first step" is to classify the voxels as being of a first type, vessel voxels, or of a second type, tissue

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voxels (page 3, lines 27-29). The "next step" is to determine which vessel voxels are boundary vessel voxels (page 3, lines 30-31). Thereafter, a distance data value is assigned to each voxel of the first type, i.e., the vessel voxels (page 4, lines 1-15). Thereafter, aberration voxels (a subset of the vessel voxels) are classified based on the distance data values (page 4, lines 16-24).

An advantage of classifying the voxels before assigning distance data values to one particular class of the voxels is that it enables a reduction in the computations needed to analyze the data set of an object to obtain an indication of the volume of the aberration in the object. Specifically, it becomes possible to analyze only one particular type of voxel (the first type) and not other types of voxels (not the second and further types). Thus, as described in the specification at page 4, lines 13-14, only vessel voxels would be analyzed (and assigned distance data values) to the exclusion of tissue voxels, since the objective of the disclosed embodiment of the invention is to identify aberration voxels which are a subset of the vessel voxels and do not include any tissue voxels.

Cheng et al. does not disclose, teach or suggest a method including all of the features recited in amended claim 1.

Cheng et al. teach a method for analyzing three-dimensional ultrasonic images for the purpose of classifying voxels of the

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images as indicative of a "tumor", "normal tissue" or a "boundary". The first step in the method is to determine a membership function based on the intensity and morphological center of the voxels (see col. 5, lines 34-47). Thereafter, the voxels are classified based on the membership function (see col. 6, lines 33-40). Classification of the voxels must follow generation of the membership function because the classification is based on the membership function (see the Abstract and col. 5, lines 49-53).

In contrast to the present claimed invention, Cheng et al. does not disclose, teach or suggest classifying voxels and thereafter assigning distance data values only to one particular class or type of voxels. Rather, Cheng et al. describes first assigning data values to all voxels in a data set and then classifying the voxels based on the assigned data values. This results in unnecessary computations and therefore slows the speed at which the data set can be processed.

In view of the foregoing, claim 1 is patentable over Cheng et al. under 35 USC §102.

Moreover, it would not have been obvious to one of ordinary skill in the art at the time the invention was made to modify Cheng et al. based upon the teachings of Cheng et al. to arrive at the present claimed invention as defined by amended claim 1.

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The other references of record do not close the gap between the present claimed invention as defined by claim 1 and Cheng et al. Therefore, claim 1 is patentable over Cheng et al. and all of the other references of record under 35 USC 102 as well as 35 USC 103.

Claims 2-10 are either directly or indirectly dependent on claim 1 and are patentable over the references of record in view of their dependence on claim 1 and because the references of record do not disclose, teach or suggest each of the limitations set forth in claims 2-10.

For example, with respect to claim 2, Cheng et al. does not disclose the determination of two different types of boundary voxels, one type of boundary voxel being those between first and second types and another type of boundary voxel being those between two different subsets of the first type, i.e., a boundary between "aberration voxels" of the first type and "non-aberration voxels" of the first type. Rather, there is only a single type of boundary voxels determined in Cheng et al., i.e., the "boundary" voxels between the "tumor" and "normal tissue" voxels.

#### NEW CLAIMS

New claims 11-20 are added to the present application. Claims 11-15 are either directly or indirectly dependent on claim 1 and further define the method thereof. Claims 11-15 are

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patentable over the cited references in view of their dependence on claim 1 and because the references do not disclose, teach or suggest each of the limitations set forth in claims 11-15. Claim 16 is an independent method claim directed to delineating an aneurysm in a blood vessel. Claim 16 is patentable over the cited references for reasons, *inter alia*, set forth above in connection with claim 1. Claims 17-20 are either directly or indirectly dependent on claim 16 and further define the method thereof. Claims 17-20 are patentable over the cited references in view their dependence on claim 16 and because the references do not disclose, teach or suggest each of the limitations set forth in claims 17-20.

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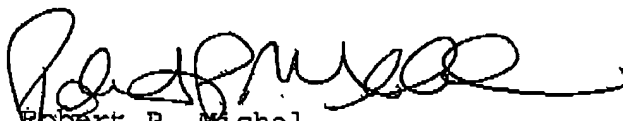
If the Examiner disagrees with any of the foregoing, the Examiner is respectfully requested to point out where there is support for a contrary view.

Entry of the amendment, allowance of the claims, and the passing of the application to issue are respectfully solicited.

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If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,



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